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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

**WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES,
AND DNA-PROFILING IN PARTICULAR**

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AN EDV COURT CASE IN WHEAT IN GERMANY

Document prepared by an expert from the International Seed Federation (ISF)



An EDV court case in Wheat in Germany

UPOV-BMT - November 2011

Marcel Bruins, Secretary-General ISF

Initial Variety (INV)

Crossed:	1986	Austria
Registered:	Dec 1997	Austria
Registered:	Spring 1998	Germany

Putative Essentially Derived Variety PEDV

Registered Spring 2001 Germany
Breeder IV became aware in fall 2001

Breeder IV did first tests:

- no visual difference
- no difference in protein pattern (electrophoresis)
- 1st Marker test with 43 markers: 1 difference
(note breeder's experience: sister lines (F3) differ 3-4 markers)

➔ According to breeder IV the claimed pedigree of PEDV was false



Response breeder PEDV

Holder of PEDV rejected all claims, based on difference of UPOV descriptions (obtained in different years)

Breeder PEDV conceded to maybe have developed a sister variety
Offering a royalty but considered too low



Further Test by Breeder IV with molecular markers

92 markers: → 90 identical
2 ambiguous results

double results for INV, single (same) results for PEDV
(INV not entirely fixed for 2 loci, PEDV fixed)

Genetic expertise tells us:

- similarity far too high for random choice
 - too high for sister lines
- (Presented at UPOV-BMT Madrid 2008)

No agreement reached: => case to Court in autumn 2004



First hearing

- Due to difference in UPOV description
(in DE: 15/26 different, 4 in 2 points, 11 in 1
point) => EDV unlikely
- Marker test (92 samples) without reference
samples not conclusive
- Expert (prof. Melchinger) asked for 120
varieties / 200 markers



Annotation to UPOV description

- UPOV descriptions made in different years cannot be compared
- INV is registered in 9 countries with 5 different UPOV descriptions
- variation of INV descriptions greater than difference to PEDV in Germany



New marker analysis

- INV, 3 samples
- PEDV, 3 samples
- Named parents of INV from breeder and from IPK Gatersleben (gene bank)
- 100 anonymized wheat samples (=varieties) from Bundessortenamt BSA
- 100 SSR markers



Results: (1)

- Missing data points below 7,3%, average missing points 0,8%
- Marker WMS0389 had 13 missing points, was excluded from analysis
- All 3 repetitions of INV and PEDV identical to themselves
- All marker results of INV and PEDV in line with marker profile of parents of the INV
- INV gave with markers WMS0095 and WMS 4084 score of both parents, PEDV only of 1 parent
- Other 97 markers INV and PEDV identical



Results (2) – Genetic Similarity (GS)

4950 Pairs: (100 x 99) /2

GS min 0,223

GS max 0,974

GS average 0,466

Q 95% 0,589

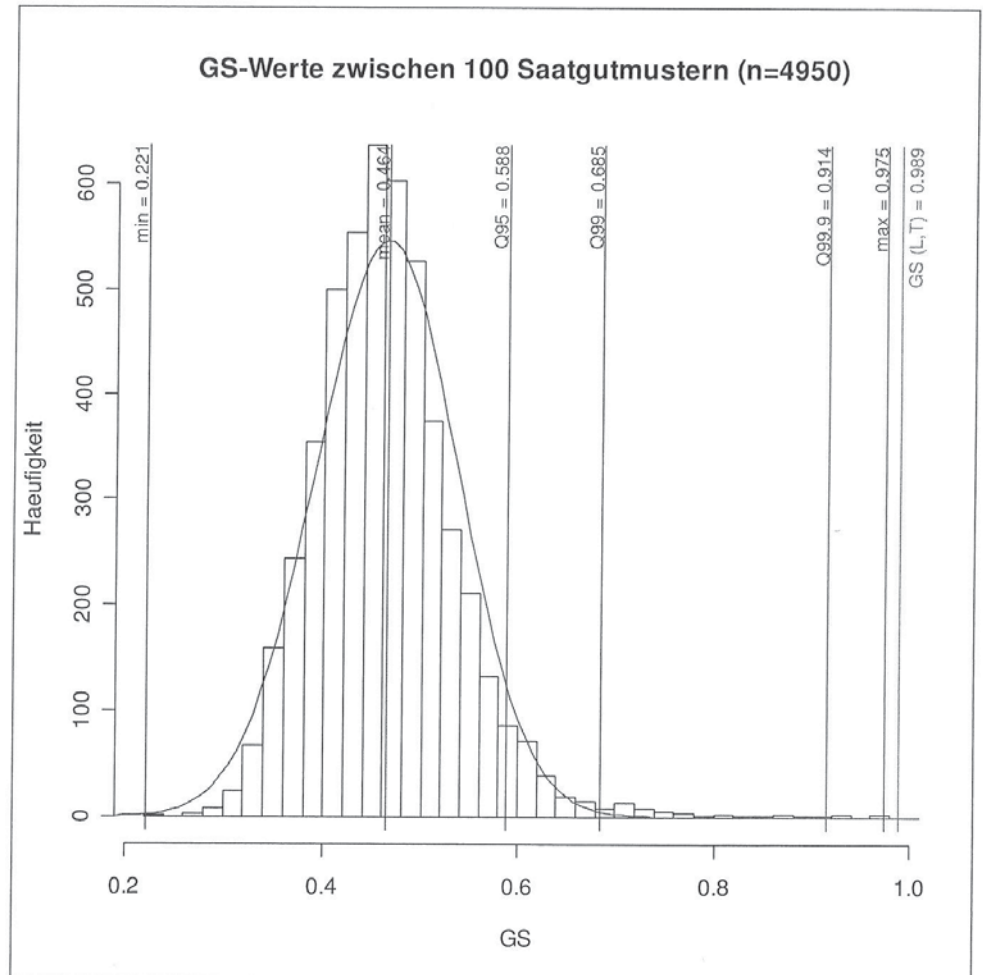
Q 99% 0,682

Q 99,9% 0,913

GS (INV-PEDV) 0,990



Results of all 100 SSR markers



Results (3)

GS of both INV & PEDV to parent 1 = 0,737

GS of both INV & PEDV to parent 2 = 0,697

(INV and PEDV: identical in this respect)

Expected difference if ancestor was derived in:

- F4 6-7 markers
- F5 3-4 markers
- F6 1-2 markers

Additional expert statement:

Increase to 200 markers (as initially asked for) would not have sharpened the result



Resulting Action

December 2010: Based on this analysis, Court decided that PEDV = EDV of INV and claimant was awarded the case in court

Defendant appealed, claiming:

- Phenotypic difference as stated in UPOV descriptions
- That a variety is homogeneous and cannot lead to an EDV; ancestor must have been inhomogeneous
- Markers cover only small part of genome and the conclusion of the similarity of the genome is therefore unviable

CASE is now at High Court



Post scriptum

Marker analysis of 100 wheat varieties shows:

Homozygosity per Individuum

Ø 98,0% - min 91% max 100%

Heterozygosity per Individuum

Ø 1,1% - min 0%, max 6%

Conclusion:

Registered varieties with phenotypic homogeneity to pass DUS
=>show genetic inhomogeneities that EDV certainly is possible.



Acknowledgements

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Thank you for your attention



More information:
www.worldseed.org

